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Abstract

We study the relationship between food access and upward mobility using tract-level data on intergenerational outcomes and USDA-defined food desert classifications. While urban low-access tracts are, on average, higher income and more mobile than high-access tracts, this pattern reverses in rural areas. To isolate the role of food access, we estimate both linear and nonlinear models controlling for median income and urban status, comparing results across three USDA thresholds.

Nationally, we find a small positive effect of food access on mobility in low-income urban areas, but this is driven by six large states. Counterintuitively, many states show higher economic mobility in low-access urban tracts compared to high-access tracts. A random forest model predicts higher mobility in urban food deserts in the majority of states, highlighting regional variation and the limits of national food access metrics.

Introduction & Motivation

Food and Neighborhoods Access

Economic mobility varies sharply across neighborhoods in the U.S. One commonly cited factor is food access—especially in areas labeled as “food deserts” by USDA definitions.

These classifications are widely used in policy, but it's unclear whether low food access consistently predicts lower upward mobility.

This project was inspired by these questions:

- Do food deserts correspond to lower mobility, as commonly portrayed?
- How does this differ across the United States and by income level?
- How do different USDA definitions change the estimated effect of food deserts?
- What do these findings mean for how we think about food security and policy interventions?

Using tract-level data on mobility, income, and food access, we find that the link between access and opportunity is surprisingly state-dependent, and that seemingly arbitrary definition changes result in large, national shifts.

Data and Definitions

Data

Upward mobility outcomes come from the 2018 Opportunity Atlas: Mapping the Childhood Roots of Social Mobility by Raj Chetty, Nathaniel Hendren, John Friedman, Maggie R. Jones, and Sonya R. Porter, available through the U.S. Census Bureau and Opportunity Insights. The dataset is based on Chetty and Hendren's “The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects” and reports children's outcomes in adulthood, based on the neighborhood they grew up in.

We crosswalked this data with the USDA's Food Access Research Atlas, which reports supermarket accessibility and related population indicators, also at the tract level.

We use three USDA definitions of low access, based on distance to the nearest supermarket, supercenter, or large grocery store:

- LAhalfand10: more than ½ mile (urban) or 10 miles (rural)
- LA1and10: more than 1 mile (urban) or 10 miles (rural)
- LA1and20: more than 1 mile (urban) or 20 miles (rural)

Methodology

Estimating the Effect of Food Access on Upward Mobility

To isolate the relationship between food access and economic mobility, we estimate the following linear regression model:

OLS Specification

$$kfr_weighted = \beta_0 + \beta_1(LA) + \beta_2(Urban) + \beta_3(LA \times Urban) + \beta_4(\ln_income) + \varepsilon$$

Where,

- *kfr_weighted* measures the average income rank in adulthood for children of low-income parents in a given tract (a standard measure of upward mobility);
- *LA* is an indicator for low food access under one of three USDA definitions;
- *Urban* indicates whether a tract is urban or rural;
- *LA × Urban* is an interaction term capturing whether the effects of food access differ by urbanicity;
- *ln_income* controls for log median household income.

To interpret this term more clearly, we compute:

$$\Delta_2 (\delta_{\alpha_2} - \delta_{\alpha_1}) = -(\beta_1 + \beta_3)$$

This captures the difference in mobility between urban low-access and urban high-access tracts, holding income constant.

Definitions

The baseline mobility gap between urban and rural high-access tracts changes depending on how food access is defined, showing how definitions matter:

USDA Access Definition	$\beta_2(Urban)$ Coefficient	Significance	Interpretation
LAhalfand10	+0.0004	Not sig.	No real baseline difference between urban and rural, if both are not low access
LA1and10	+0.0013	★★ (p = 0.009)	Urban areas have slightly higher upward mobility than rural, when both are well-served
LA1and20	-0.0036	★★★ (p < 0.001)	Urban areas have significantly lower mobility than rural in baseline case

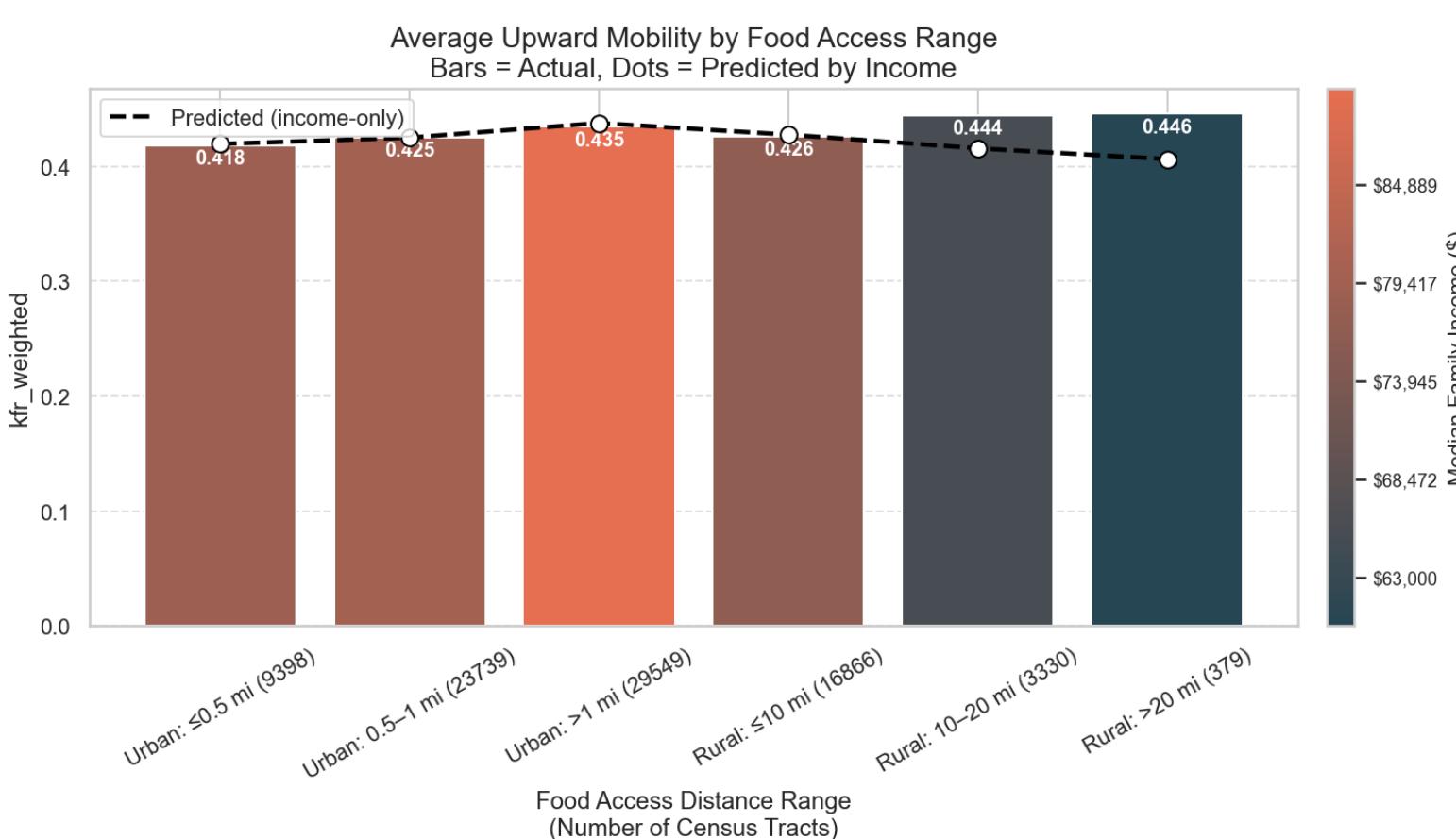
Results/Data Analysis

National Patterns

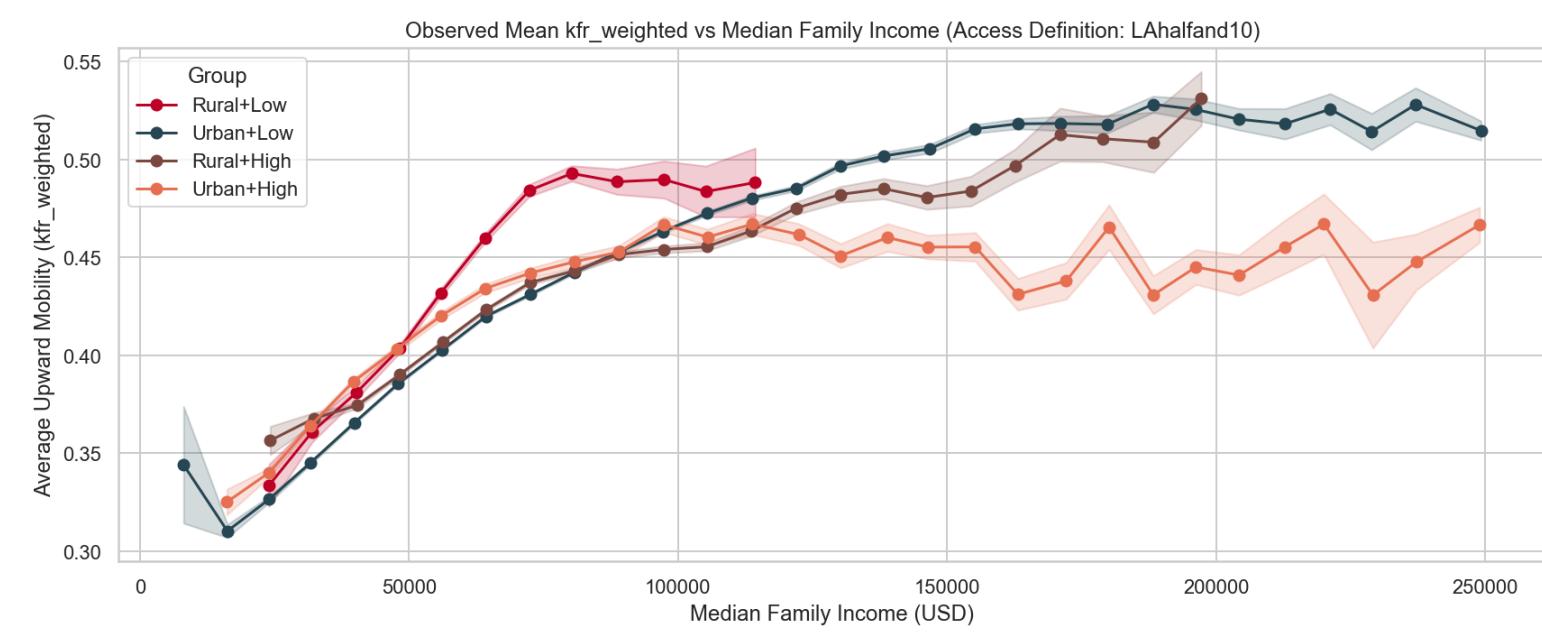
The structure of our data allows us to group tracts into six food access zones based on distance to the nearest supermarket, following USDA definitions.

In urban areas, we see that *kfr_weighted* increases with distance, following income predictions. In rural areas, mobility also rises with distance from grocery stores, but income declines. The most remote rural tracts have the lowest incomes and the highest mobility, contradicting income-based predictions.

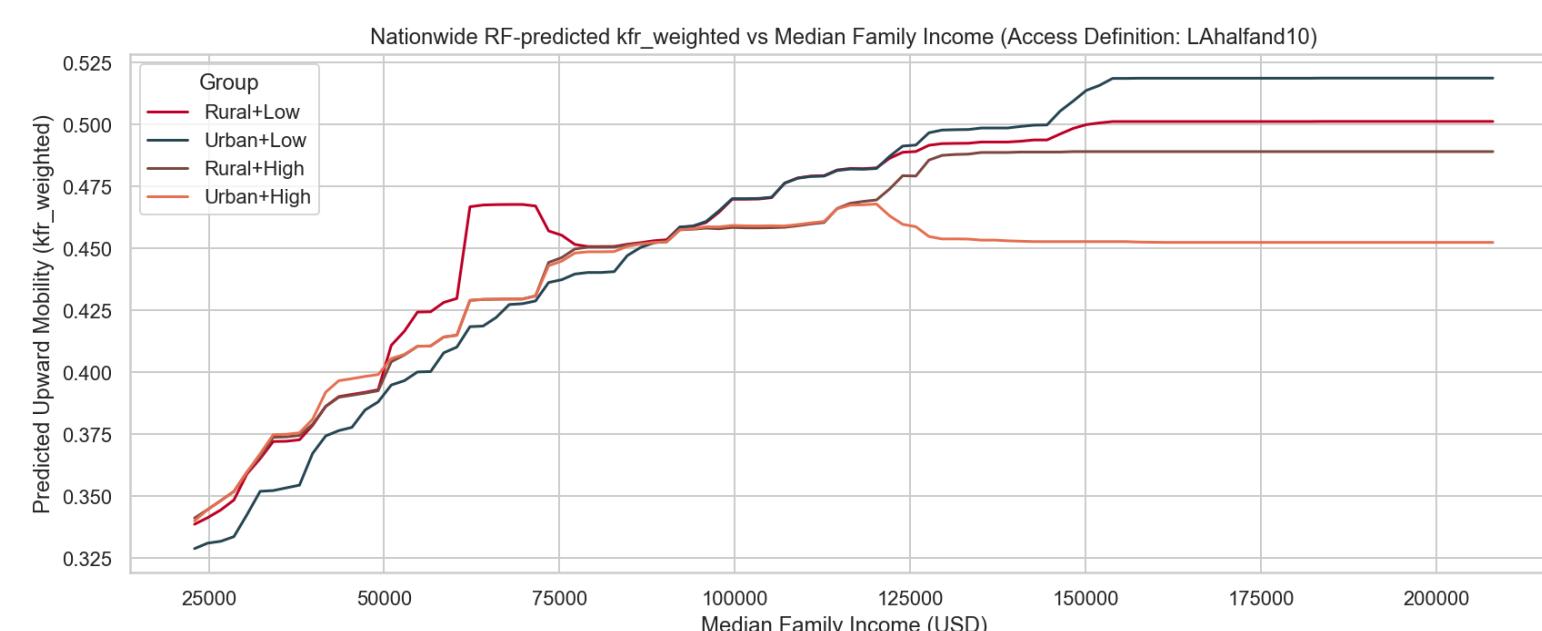
We would like to explore how this pattern might be interpreted in urban economics models - whether grocery stores function as amenities that shape residential sorting, or as local centers that reflect broader economic structure - and would appreciate any thoughts you have here at this conference.



Another way to look at these variables is by splitting the tracts into Rural Low-Access, Urban Low-Access, Rural High-Access, and Rural Low-Access:



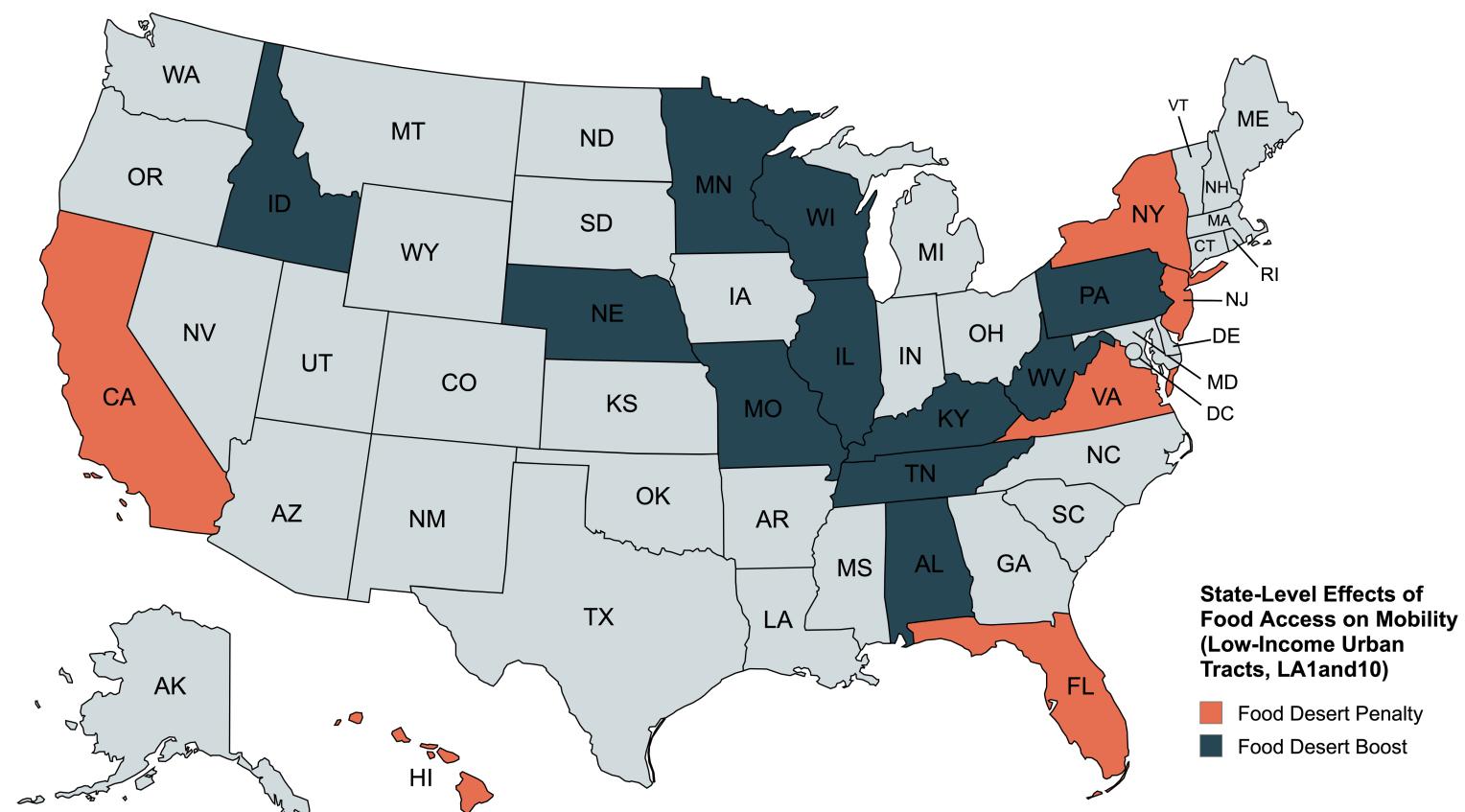
And for a random forest extension:



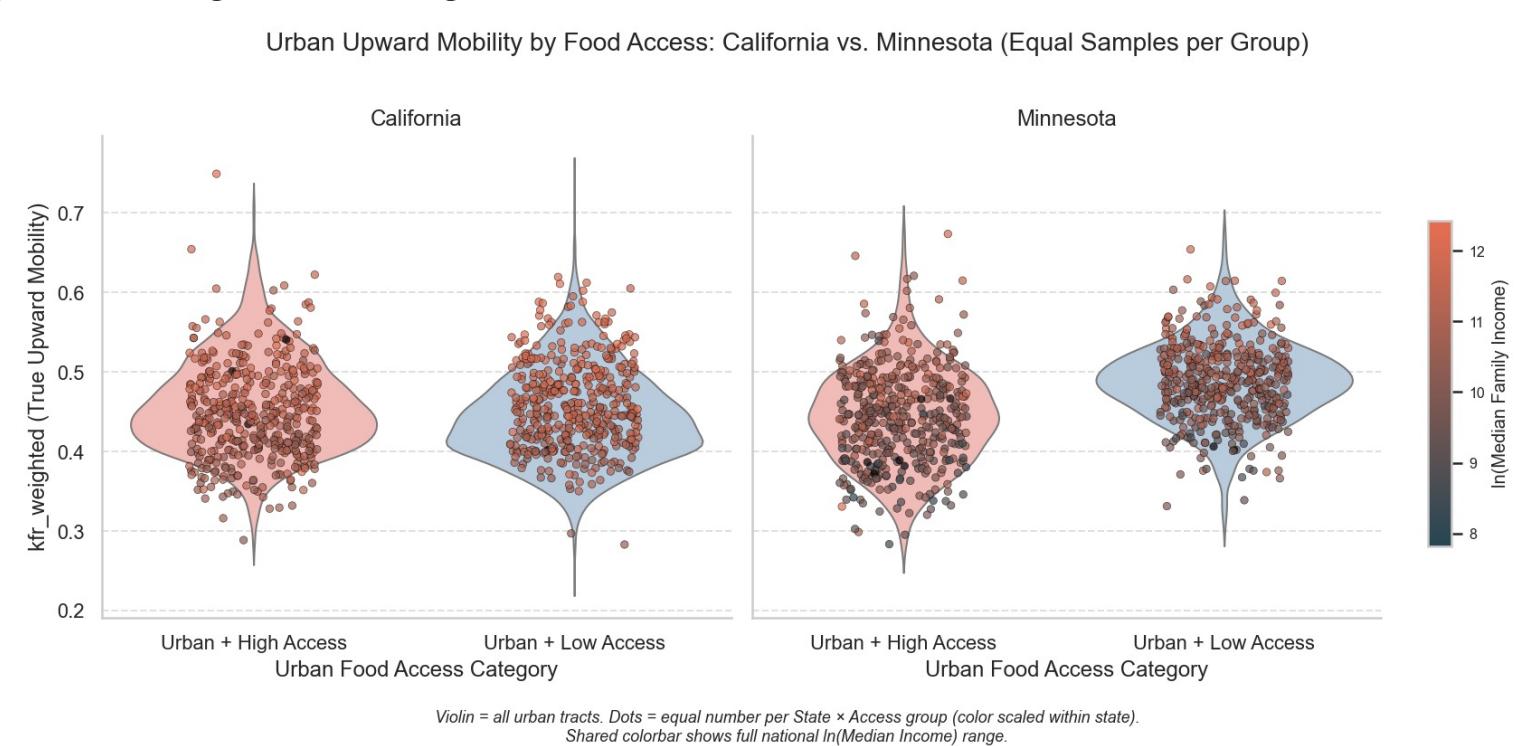
Low-Access Low-Income Tracts

Under the LA1and10 definition, the effect of food access on

upward mobility among low-income urban tracts varies sharply by state. While some states follow the traditional food desert story—where proximity to a grocery store is associated with better outcomes—others show the reverse.



At this threshold, six states (e.g., California, Florida) had urban high-access tracts with significantly higher mobility, while eleven states (e.g., Minnesota, Illinois) had urban low-access tracts with significantly higher mobility. Under the LA1and10 definition, a random forest model finds that in 38 states, low-access urban tracts predict at least a 1-point gain in adult income rank (*kfr_weighted*), while only 1 state shows an equivalent gain for high-access tracts.



Acknowledgements

Citations

- Chetty, R., & Hendren, N. (2018). The impacts of neighborhoods on intergenerational mobility I: Childhood exposure effects. *The Quarterly Journal of Economics*, 133(3), 1107–1162. <https://doi.org/10.1093/qje/qjy007>
- U.S. Department of Agriculture, Economic Research Service. Food Access Research Atlas. <https://www.ers.usda.gov/data-products/food-access-research-atlas/>
- U.S. Census Bureau. (2025, July 15). Opportunity Atlas Data Tables. <https://www.census.gov/programs-surveys/ces/data/public-use-tables.html>
- Torner, A., & George, C. (2021, August 17). Beyond “food deserts”: America needs a new approach to mapping food insecurity. Brookings Institution. <https://www.brookings.edu/articles/beyond-food-deserts-america-needs-a-new-approach-to-mapping-food-insecurity/>

Additional Resources

University of Nebraska – Omaha Academic Research Poster Template | mapchart.net



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